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SCIENTIFIC BOOKS.

Text-Book of Physiology. Edited by E. A. SCHÄFER, LL.D., F.R.S., Professor of Physiology, University of Edinburgh. Edinburgh and London, Young J. Pentland; New York, The Macmillan Co. Vol. II.

In the preface to the first volume, issued nearly two years ago, it is stated that 'the want of a text-book in the English language to which students could turn for information beyond that contained in the ordinary manuals has long been felt by teachers of physiology (in England). 'The most extensive of the existing text-books do not aim at giving the full and precise information, nor the references to original authorities which are required by the advanced student.' The object of the work, the second and final volume of which is now before us, is to supply this want. The object is an excellent one. But when we enquire how far the editor and his able collaborators have succeeded in their laudable aim, we feel bound to answer that the execution does not in all points correspond with the design. Not that the book is devoid of good qualities. In certain respects its merits are conspicuous. No text-book of physiology in the language is more accurate. None is so extensive in its scope. Few are so scientific in treatment. But as regards its avowed purpose it labors under a serious, if not a fatal, defect. The 'advanced student' for whom it is intended scarcely exists at present. The twentieth century, which, as the newspapers have assured us, holds so many wonders in its womb, may in the fullness of time produce from the strangely miscellaneous contents of that mysterious receptacle some such miracle of precocious learning. In this year of grace 1901, he is, we fear, almost as much an abstraction as Macaulay's omniscient schoolboy. We can hardly help thinking, indeed, that whatever may have been the original plan of the book, the editor has not always been able to prevent his contributors from running away from him, or the contributors their subjects from running away with them. The consequence is that while some of the authors have evidently had in mind as their model the exhaustive 'Handbuch' of Hermann, and have

treated their respective themes with a wealth of illustrative detail and a copiousness of reference which leave little to be desired for the purposes of the professional physiologist, the contributions of others are such in contents and style as a student of actual flesh and blood, who had diligently improved his time in the physiological department of a medical school of actual brick and mortar, might hope to read with intelligence and profit.

We are far from supposing that a book on the lines of the 'Handbuch,' addressed to expert physiologists, is without value. On the contrary, we believe that if Professor Schäfer and his talented coadjutors, starting with the present work as a basis, expanding what is incomplete and retrenching what is too elementary, were to develop it into a really comprehensive treatise, and do for the physiology of the beginning of the twentieth century what Hermann and his fellow-workers did for the physiology of the early eighties of the nineteenth, they would confer a greater benefit on the cultivators of the science in all lands than a dozen Richet's Dictionaries will ever do. But in order that this may be accomplished, the impossible task of crowding into 2,200 pages a far greater volume of knowledge than Hermann twenty years ago was barely able to grapple with in more than 5,000 pages, would have to be frankly given up, and the idea of combining within the same boards a book for students and a book for experts once and for all abandoned.

When all due deduction is made for the discrepancy between plan and performance, it would be unjust not to say that the work remains by far the most notable recent attempt at a systematic exposition of physiology on a large scale in any language. Upon the whole, too, it cannot be denied that the authors, while avoiding hypercriticism in handling the experimental results of others, have escaped the still more serious error of making their articles mere compilations in which all the facts that have crept into the literature are spread before the reader without indication of their relative authenticity and importance. Occasionally, however, but so rarely as to excite surprise, it would seem that the Rhadamanthus of the blue pencil must have nodded over his long task.

For instance, on p. 454 the notion that 'the close agreement between the effect upon the functional changes (in nerve) of external CO₂, and of previous nerve activity, is an indication that CO₂ is produced during the active state,' is mentioned without any warning to the innocent student that this is a mere airy speculation, such stuff, in fact, as only dreams and Croonian lectures are made of. By the way, it seems rather a pity that in a book of this size the use of such inaccurate contractions as CO₂ for carbon dioxide should have been countenanced for the sake of a petty saving of space.

On p. 499, in the account given of the changes of conductivity produced in a nerve by the passage of electrical currents it is stated that the block is established during closure at the anode and after opening at the cathode. No mention is made of the well-known experiments of Hermann and others which demonstrate that the block at the cathode during closure of a voltaic current is relatively greater than at the anode, while after opening, this relation is reversed.

On 48, the statement is made that in Stolnikow's determination of the output of the heart on the 'simplified circulation,' the output was probably maximal on account of the low resistance to the outflow. It ought not to be left to the student to supply the criticism that the heart can not have been normally fed through the coronary arteries with a pressure of only 30 or 40 mm. of mercury in the aorta, and therefore probably was not beating with normal strength. On the same page a comparison of Zuntz's results on the output in the horse, obtained by a method theoretically perfect, with those of Tigerstedt in the rabbit, obtained by a method of dubious propriety, is concluded by the remark that when the output per second is expressed as a fraction of the body-weight the results of the two observers roughly agree. The reader would inevitably draw from this passage the inference that the accuracy of Tigerstedt's numbers is supported by this agreement. The exact opposite is the case. For it is well established that the output of the heart is much greater in proportion to the body-weight in small animals than in large. If, then,

Zuntz's results are right for the horse, Tigerstedt's can not be right for the rabbit.

We are glad to see that Dr. Gaskell in his article on the contraction of the cardiac muscle, written in the interesting and almost autobiographical style so characteristic of this author when he handles this theme, has at last rid himself of the picturesque hypothesis that the positive electrical variation, observed by him in the quiescent auricle of the tortoise on stimulation of the vagus, indicates 'anabolic' changes in the muscular fibers, while the negative variation seen on stimulation of the augmentor nerves of the quiescent ventricle of the frog or toad indicates 'katabolic' changes, and has adopted the more prosaic view of other writers, that the electrical changes are simply associated with alterations in the tone of the heart muscle too small to be easily seen.

The contributors to this and the previous volume include most of the prominent workers in English physiology; and nearly all write upon subjects the knowledge of which they have advanced by their own labors. Thus, Dr. Leonard Hill, in one of the best articles in the book, treats of the circulation; Sir J. Burdon Sanderson, of striped muscle, including the electrical phenomena of this tissue, in the investigation of which he stands facile princeps in the English-speaking world; Professor Gotch, of nerve and electrical organ; Professors Schäfer and Sherrington, of the central nervous system; Dr. Langley, of the sympathetic and allied systems; Professor Haycraft, of animal mechanics, taste and smell; Professor [McKendrick and Dr. Gray, of the ear and voice; Professor Starling, of the muscular and nervous mechanisms of the digestive tract, etc.; and Dr. Rivers, of vision.

G. N. I. S.

Die Lehre vom Skelet des Menschen, unter besonderer Berücksichtigung entwicklungsge-schichtlicher und vergleichend-anatomischer Gesichtspunkte und der Erfordernisse des Anthropologischen Unterrichtes an höheren Lehranstalten, bearbeitet. Von DR. F. FRENKEL, Professor am Königl. Gymnasium zu Göttingen. Mit 81 Textfiguren. Jena, Gustav Fischer. 1900.